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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/733,226

12/10/2003

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108298744US

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7590

05/13/2009

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EXAMINER

MATTHEWS, COLLEEN ANN

ART UNIT

PAPER NUMBER

2811

MAIL DATE

DELIVERY MODE

05/13/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/733,226	Applicant(s) HIATT ET AL.	
	Examiner Colleen A. Matthews	Art Unit 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 March 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 28-37, 39-47, 49 and 50 is/are pending in the application.
- 4a) Of the above claim(s) 37 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 28-36, 39-47, 49 and 50 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 03/03/2009 has been entered.

Allowable Subject Matter

The indicated allowability of claims 28, 33, 39 and 44 is withdrawn in view of the newly discovered reference(s) to Wu et al. and Kim et al. Rejections based on the newly cited reference(s) follow.

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims.

Therefore, the “second microelectronic device having a second die with a second integrated circuit and a second bond-pad” as in claim 39 (lines 11-12) and claim 44 (lines 11-12) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 28, 33, 39-41 and 43-44 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Pat. No. 6,459,150 to Wu et al. (Wu).

Re claim 28: Wu discloses a packaged microelectronic device comprising:

- a die (Fig 2A-2G, element 50) having a first side (56) and a second side opposite to the first side, the die further having
 - an integrated circuit positioned between the first and second sides;
 - a bond-pad (58) positioned on the first side of the die and electrically coupled to the integrated circuit;
 - a passage (70) extending completely through the die and aligned with and extending through the bond-pad (see Fig 2C);
 - a first conductive material (90) deposited in a first portion of the passage adjacent to the first side of the die to form a conductive plug electrically connected to the bond-pad (see Fig 2F); and
 - a second conductive material (92) deposited in a second portion of the passage in contact with the conductive plug to at least generally fill the passage from the conductive plug to the second side of the die (see Fig 2G).

Re claim 33: Wu discloses a microfeature workpiece (Fig 2A-2G) having a first side (56) and a second side opposite to the first side, the microfeature workpiece comprising:

- at least one die (62);
- a bond-pad (58) formed on the first side of the microfeature workpiece;

a passage (70) extending completely through the bond-pad and the die from the first side of the microfeature workpiece to the second side of the microfeature workpiece (see Fig 2C);

a first conductive material (90) deposited in a first portion of the passage adjacent to the first side of the microfeature workpiece to form a conductive plug in contact with the bond-pad (see Fig 2F); and

a second conductive material (92) deposited in a second portion of the passage in contact with the conductive plug to at least generally fill the passage from the conductive plug to the second side of the microfeature workpiece (see Fig 2G).

Re claim 39: Wu discloses a microelectronic device set comprising:

a first microelectronic device (Fig 3A-3F, 80) having:

a first die (80) with a first integrated circuit and a first bond-pad (82) electrically coupled to the first integrated circuit, the first die further including a passage (76) extending completely through the first die and the first bond-pad (see Fig 3B); and

a conductive interconnect (90/92) deposited in the passage, the conductive interconnect including a first conductive material (90) deposited in a first portion of the passage to form a conductive plug (see Fig 3E), and a second conductive material deposited in a second portion of the passage in contact with the conductive plug to at least generally fill the passage (see Fig 3F); and

at least a second microelectronic device having a second die (50) with a second integrated circuit and a second bond-pad (58) electrically coupled to the second

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integrated circuit, wherein the second bond-pad is electrically coupled to the conductive interconnect of the first microelectronic device (see Fig 3F).

Re claim 40: Wu discloses the microelectronic device set of claim 39 wherein the first microelectronic device is attached to the second microelectronic device in a stacked-die arrangement (see Fig 3F).

Re claim 41: Wu discloses the microelectronic device set of claim 39, further comprising a solder ball (100) disposed between the conductive interconnect of the first microelectronic device and the second bond-pad of the second microelectronic device to electrically couple the first bond-pad to the second bond-pad (see Fig 3F).

Re claim 43: Wu discloses the microelectronic device set of claim 39 wherein the first microelectronic device (80) further includes a redistribution layer (optional layer 64, shown in Fig 2D) formed on the first die, the redistribution layer including a conductive line having a first end portion attached to the first bond-pad and a second end portion positioned outward of the first end portion, wherein the second end portion is configured to receive electrical signals and transmit the signals to at least the first integrated circuit of the first die and the second integrated circuit of the second die (col 8 lines 31-39).

Re claim 44: Wu discloses a microelectronic device set comprising:

a first microelectronic device (Fig 3A-3F) having:

a first die (80) with a first integrated circuit and a first bond-pad (82) electrically coupled to the first integrated circuit, the first die further including a passage (76) aligned with and extending through the first bond-pad (see Fig 3B); and

a conductive interconnect (90/92) deposited in the passage, the conductive interconnect including a first conductive material (90) deposited in a first portion of the passage to form a conductive plug in contact with the bond-pad (see Fig 3E), and a second conductive material (92) deposited in a second portion of the passage in contact with the conductive plug to at least generally fill the passage (see Fig 3F); and

at least a second microelectronic device having a second die (50) with a second integrated circuit and a second bond-pad (58) electrically coupled to the second integrated circuit, wherein the second bond-pad is electrically coupled to the first bond-pad of the first microelectronic device (see Fig 3F).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 31, 34 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 6,459,150 to Wu et al. (Wu) in view of U.S. Pub. No. 2004/0087441 to Hirakata et al. (Hirakata).

Regarding claims 31, 34 and 46, Wu discloses the device of claims 28, 33 and 44 as above including the first conductive material in contact with an exposed surface of the bond-pad. Wu fails to disclose wherein the first conductive material includes an

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electronic ink. Hirakata teaches a first conductive material (conductive paste; paragraph 102) includes an electronic ink (ink jetting; paragraph 102) in contact with an exposed surface of the bond-pad. It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the first conductive material including electronic ink as taught by Hirakata because with electronic printing processes the plug only needs to be formed in the desired area therefore wasted material is reduced.

Claims 32, 35 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 6,459,150 to Wu et al. (Wu) in view of U.S. Pub. No. 2004/0087441 to Bock et al. (Bock).

Regarding claims 32, 35 and 47, Wu discloses the device of claims 28, 3 and 44 as above including the first conductive material in contact with an exposed surface of the bond-pad. Wu fails to disclose wherein the first conductive material includes a nano-particle deposition. Bock teaches using a nano-particle process to deposit a conductive material (abstract lines 15-20). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Wu to have the first conductive material includes a nano-particle deposition as in Bock in order to deposit fine features.

Claims 29-30, 36, 45 and 49-52 rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 6,459,150 to Wu et al. (Wu) in view of U.S. Pat. No. 6,809,421 to Hayasaka et al. (Hayasaka).

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Re claims 29, 30, 36, 45: Wu discloses packaged microelectronic device of claims 28, 33 and 44. Wu fails to disclose an insulative layer deposited in the passage between the die and the first and second conductive materials. Hayasaka teaches (Fig 17A and 17B) an insulative layer (14) deposited in the passage between the die (10) and the first and second conductive materials (15 & 8). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Wu to include the insulative layer as taught by Hayasaka in order to insulate the die from the via to prevent short circuiting.

Re claims 49-52: The packaged microelectronic device of claims 28, 33, 39 and 44 wherein the second conductive material contacts the conductive plug. Wu fails to disclose an insulative layer deposited in the passage, wherein the second conductive material contacts the insulative layer. Hayaska teaches (Fig 17A-17B) an insulative layer (14) deposited in the passage, wherein the second conductive material (8) contacts the conductive plug (15) and the insulative layer (14). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Wu to include the insulative layer as taught by Hayasaka in order to insulate the die from the via to prevent short circuiting.

Claims 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 6,459,150 to Wu et al. (Wu) in view of U.S. Pat. No. 6,982,487 to Kim et al. (Kim)

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Re claim 42: Wu discloses the microelectronic device set of claim 39 wherein the passage (76) is a first passage. Wu fails to disclose wherein the second microelectronic device further includes a second passage extending through the second die and the second bond-pad, and wherein the second passage is completely filled with a third conductive material. Kim teaches a first microelectronic device (Fig 16, 46) with a first passage extending through a first bond pad (31) including a first conductive material (52) and a second conductive material (54) and a second microelectronic device (see Fig 17) further including a second passage extending through the second die and a second bond-pad where the second passage is completely filled with a third conductive material. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Wu to include a second passage in the second microelectronic device as taught by Kim in order to provide interconnection for the devices.

Double Patenting

A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

Applicant is advised that **should claim 29 be found allowable, claim 30 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof.** When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Response to Arguments

Applicant's arguments with respect to claims 38-36, 39-47 and 49-50 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Colleen A. Matthews whose telephone number is (571)272-1667. The examiner can normally be reached on Monday - Friday 8AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynne Gurley can be reached on 571-272-1670. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/C. A. M./
Examiner, Art Unit 2811

/Lynne A. Gurley/
Supervisory Patent Examiner, Art
Unit 2811